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Electromagnetic compatibility and Radio spectrum Matters (ERM); Impact of CENELEC EN 55035 on ETSI EMC Standards

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document is intended to review the impact of CENELEC EN 55035 [i.1] on existing ETSI EMC deliverables and to recommend to ETSI TC ERM as to what (if any) changes should be made to these deliverables.

In should be noted that if changes are made to existing deliverables, then the usual procedures as per the ETSI TWP [i.29] are to be followed.

It should also be noted the present document bases it review around edition 1 of CENELEC EN 55035 [i.1].

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] CENELEC EN 55035:2017: "Electromagnetic compatibility of multimedia equipment - Immunity requirements".

[i.2] CISPR 35 (08-2016): "Electromagnetic compatibility of multimedia equipment - Immunity requirements".

[i.3] ETSI EN 300 386 (V2.1.1): "Telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements; Harmonised Standard covering the essential requirements of the Directive 2014/30/EU".

[i.4] ETSI EN 301 489 (all parts): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".

[i.5] ETSI EN 301 489-1 (V2.1.1): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU".

[i.6] ETSI ES 201 468: "Additional ElectroMagnetic Compatibility (EMC) requirements and resistibility requirements for telecommunications equipment for enhanced availability of service in specific applications".

[i.7] ETSI TR 101 651: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Classification of the electromagnetic environment conditions for equipment in telecommunication networks".

[i.8] CENELEC EN 61000-6-1: "Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments".

[i.9] CENELEC EN 61000-6-2: "Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments".

[i.10] CENELEC EN 55020: "Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement".

[i.11] CENELEC EN 55024: "Information technology equipment - Immunity characteristics - Limits and methods of measurement".

[i.12] CISPR 20: "Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement".

[i.13] CISPR 24: "Information technology equipment - Immunity characteristics - Limits and methods of measurement".

[i.14] CENELEC EN 55032: "Electromagnetic compatibility of multimedia equipment - Emission Requirements".

[i.15] CISPR 32: "Electromagnetic compatibility of multimedia equipment - Emission Requirements".

[i.16] CENELEC EN 61000-4-2 (2009): "Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test".

[i.17] CENELEC EN 61000-4-3 (2006), A1 (2008) and A2 (2010): "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".

[i.18] CENELEC EN 61000-4-4 (2012): "Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test".

[i.19] CENELEC EN 61000-4-5 (2006): "Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test".

[i.20] CENELEC EN 61000-4-6 (2009): "Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields".

[i.21] CENELEC EN 61000-4-11 (2004): "Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests".

[i.22] CENELEC EN 61000-4-8 (2010): "Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test".

[i.23] ISO 7637-2 (2004): "Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only".

[i.24] CENELEC EN 61000-4-20 (2010): "Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides".

[i.25] CENELEC EN 61000-4-21 (2011): "Electromagnetic compatibility (EMC) - Part 4-21: Testing and measurement techniques - Reverberation chamber test methods".

[i.26] Recommendation ITU-T K.20: "Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents".

[i.27] Recommendation ITU-T K.21: "Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents".

[i.28] ETSI EN 300 132-2: "Environmental Engineering (EE); Power supply interface at the input to telecommunications and datacom (ICT) equipment; Part 2: Operated by -48 V direct current (dc)".

[i.29] ETSI Directives, Technical Working Procedures.

[i.30] Commission Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast).

[i.31] Commission Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

[i.32] CISPR 16-1-2: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements".

[i.33] CENELEC EN 55016-1-2: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements".

[i.34] ETSI EN 303 446-1 (DEN/ERM-EMC-348-1): "ElectroMagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 1: Requirements for equipment intended to be used in residential, commercial and light industry locations; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU".

[i.35] ETSI EN 303 446-2 (DEN/ERM-EMC-356): "ElectroMagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 2: Specific conditions for equipment intended to be used in industrial locations; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

audio equipment: equipment which has a primary function of either (or a combination of) generation, input, storage, play, retrieval, transmission, reception, amplification, processing, switching or control of audio signals

broadcast receiver equipment: equipment containing a tuner that is intended for the reception of broadcast services messages and which may be equipped with one or more ports typically for information transfer

entertainment lighting control equipment: equipment generating or processing electrical signals for controlling the intensity, colour, nature or direction of the light from a luminaire, where the intention is to create artistic effects in theatrical, televisual or musical productions and visual presentations

Information Technology Equipment (ITE): equipment having a primary function of either (or a combination of) entry, storage, display, retrieval, transmission, processing, switching, or control of data and/or telecommunication

Multimedia equipment (MME): equipment that is information technology equipment, audio equipment, video equipment, broadcast receiver equipment, entertainment lighting control equipment or a combination of these

video equipment: equipment which has a primary function of either (or a combination of) generation, input, storage, display, play, retrieval, transmission, reception, amplification, processing, switching or control of video signals

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
AM	Amplitude Modulation
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee on Radio Interference)
CPE	Customer Premise Equipment
CRT	Cathode Ray Tube
DC	Direct Current
DVB-C	Digital Video Broadcasting - Cable
EC	European Commission

EMC	ElectroMagnetic Compatibility
EN	European Norm
ES	ETSI Standard
EUT	Equipment Under Test
ITE	Information Technology Equipment
ITU-T	International Telecommunication Union - Telecommunication sector
MME	MultiMedia Equipment
RF	Radio Frequency
TC	Technical Committee
TWP	Technical Working Procedures
xDSL	x Digital Subscriber Line

4 Introduction to CENELEC EN 55035

4.1 Scope of CENELEC EN 55035

The standard EN 55035 [i.1] is a CENELEC publication that covers the immunity requirements for multimedia equipment. CENELEC EN 55035 [i.1] is based on the CISPR 35 [i.2] with the addition of European Common modifications.

CENELEC EN 55035 [i.1] applies to MME within the scope of CENELEC EN 55020 [i.10] or CENELEC EN 55024 [i.11].

4.2 Scope of CISPR 35

The CISPR 35 [i.2] publication applies to multimedia equipment (MME) having a rated AC or DC supply voltage not exceeding 600 V. MME within the scope of CISPR 35 [i.2] are:

- MME within the scope of CISPR 20 [i.12] or CISPR 24 [i.13].
- MME with a broadcast reception function.
- MME with non-broadcast wireless interfaces.
- MME intended primarily for professional.

4.3 European Common modifications in EN 55035

The European Common modifications in CENELEC EN 55035 [i.1] in respect to CISPR 35 [i.2] are:

- Amendment on the applicability of CENELEC EN 55035 [i.1]: the following sentence is added in the scope of CENELEC EN 55035 [i.1]:

  "For multimedia equipment (MME) that falls within the scope of ETSI EN 300 386 or any part(s) of ETSI EN 301 489 series, the requirements within these product specific/product family standards take precedence over the requirements within this publication."

- Modified test level and performance criteria for the broadcast reception function: the following sentence is added in CENELEC EN 55035 [i.1]:

  "Except for DVB-C, the tuned channel ± 0,5 MHz (lower edge frequency - 0,5 MHz up to the upper edge frequency + 0,5 MHz of the tuned channel) is excluded from testing. For DVB-C, the disturbance levels are 3 V/m or 3 V, except in the tuned channel ± 0,5 MHz (lower edge frequency - 0,5 MHz up to the upper edge frequency + 0,5 MHz of the tuned channel), where the disturbance level is 1 V/m."

- Normative references: the reference to IEC and CISPR publications are replaced by the corresponding EN standards (e.g. CISPR 16-1-2 [i.32] is replaced by CENELEC EN 55016-1-2 [i.33], etc.)

- Normative annex on the coverage of essential requirements of the EU EMC Directive 2014/30/EU [i.30].

NOTE: Emission requirements for multimedia equipment are covered in CENELEC EN 55032 [i.14] that is based on the Publication CISPR 32 [i.15].

5 ETSI EMC deliverables with immunity requirements

5.1 Harmonised EMC standards with immunity requirements

ETSI currently produces and maintains the following harmonised EMC standards that contains immunity requirements; ETSI EN 300 386 [i.3] and ETSI EN 301 489 series [i.4]. All these standards include immunity requirements.

ETSI EN 300 386 [i.3] is a harmonised standard for the EU Directive 2014/30/EU [i.30] and ETSI EN 301 489 series [i.4] are harmonised standards for the EU Directive 2014/30/EU [i.30] and Directive 2014/53/EU [i.31]. All these standards include immunity requirements.

ETSI is also developing two new harmonised standards for combined and/or integrated radio and non-radio equipment; these standards are ETSI EN 303 446-1 [i.34] and ETSI EN 303 446-2 [i.35]. These standards will be harmonised standards for EU Directive 2014/53/EU [i.31] and they define how to assess the immunity requirements of the combined and/or integrated radio and non-radio equipment.

5.2 Other EMC Standards with immunity requirements

ETSI ERM WG EMC also produces and maintains ETSI ES 201 468 [i.6].

ETSI ES 201 468 [i.6] defines additional immunity and resistibility requirements for telecommunications equipment for enhanced availability of service in specific applications. The immunity requirements defined in ETSI ES 201 468 [i.6] have test levels higher than the harmonised standard ETSI EN 300 386 [i.3].

6 Comparison between CENELEC EN 55035 and ETSI deliverables

6.1 Introduction

For the purposes of the present document, comparisons are between the immunity requirements in CENELEC EN 55035 [i.1] and the ETSI deliverables on EMC.

6.2 Comparison between CENELEC EN 55035 and ETSI EN 300 386

6.2.1 General

ETSI EN 300 386 [i.3] defines the immunity requirements for two environments: telecommunication centres and other than telecommunication centres. CENELEC EN 55035 [i.1] defines only one set of immunity requirements that apply to any environment.

6.2.2 Performance criteria

The general performance criteria in ETSI EN 300 386 [i.3] and CENELEC EN 55035 [i.1] are provided in table 1.

Table 1: Comparison of performance criteria in ETSI EN 300 386 [i.3] and CENELEC EN 55035 [i.1]

	ETSI EN 300 386 [i.3]	CENELEC EN 55035 [i.1]
Performance criterion A	*The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the apparatus is used as intended.* *In some cases the performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.*	*The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.* *The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.*
Performance criterion B	*The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.* *During the exposure to an electromagnetic phenomenon, degradation of performance is, however, allowed.* *No change of actual operating state or stored data is allowed.* *If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.*	*During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.* *After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended.* *The performance level may be replaced by a permissible loss of performance.* *If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.*
Performance criterion C	*Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or, in the case of switching equipment, by normal subsequent use.*	*Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.* *Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.*

6.2.3 Immunity requirements

The immunity requirements in ETSI EN 300 386 [i.3] and CENELEC EN 55035 [i.1] are defined for each type of ports. In tables 2 to 5 there is the comparison of the immunity requirements defined in these standards for each type of ports.